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(58) Field of search

G1N
 Selected US specifications from IPC sub-classes
 G01L B60C

(54) Tyre pressure detector

(57) The pressure in a tyre 36 is transmitted via its valve 27, a T-connector 23 allowing input of air, and a tube 6, to a sensor 1 sited on the wheel axis within a protective cover 40. The sensor, which comprises a potentiometer operated by a Bourdon tube and sector gear, provides an electrical output which is transmitted to the vehicle by a brush 20 and slip ring associated with the brakes (e.g. the brake drum), for display and operation of audible and visible alarms.

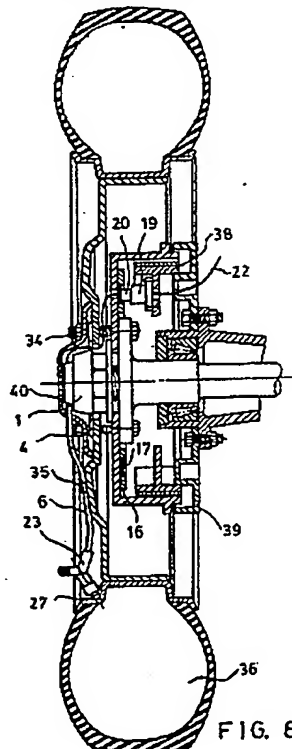


FIG. 8

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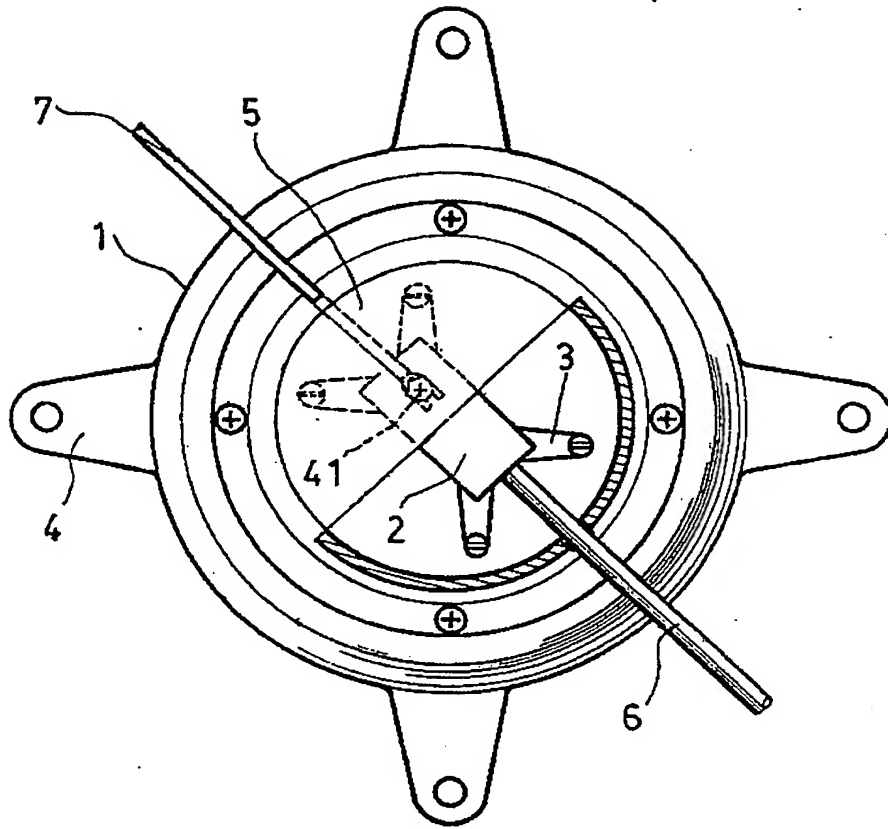


FIG. 1

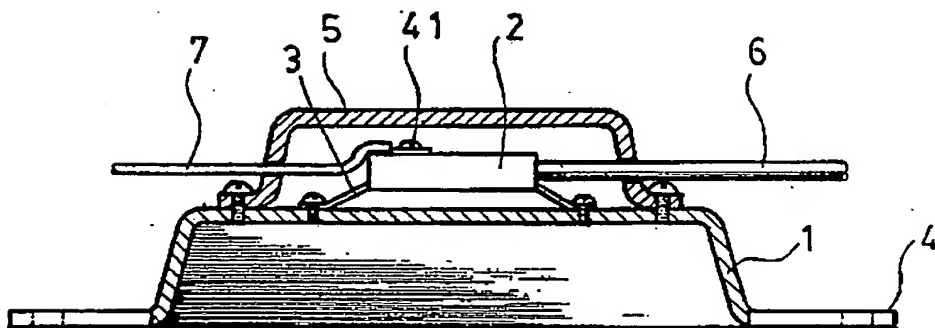


FIG. 2

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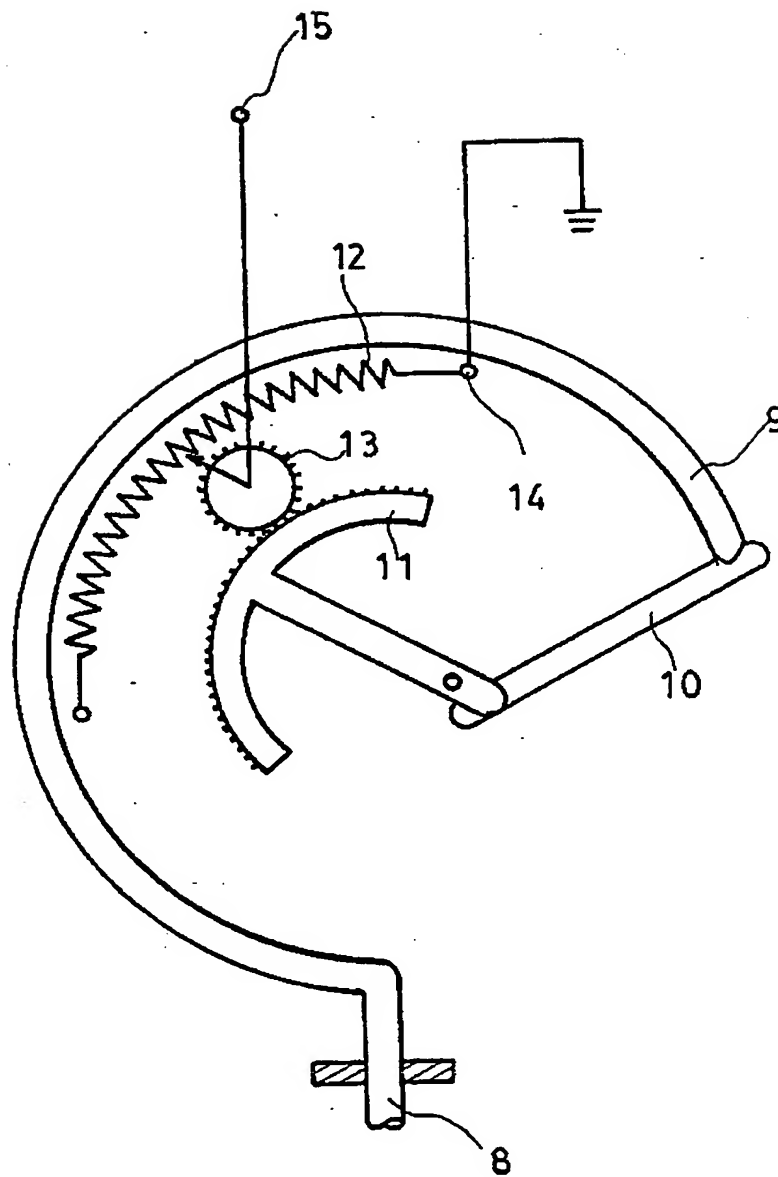


FIG. 3

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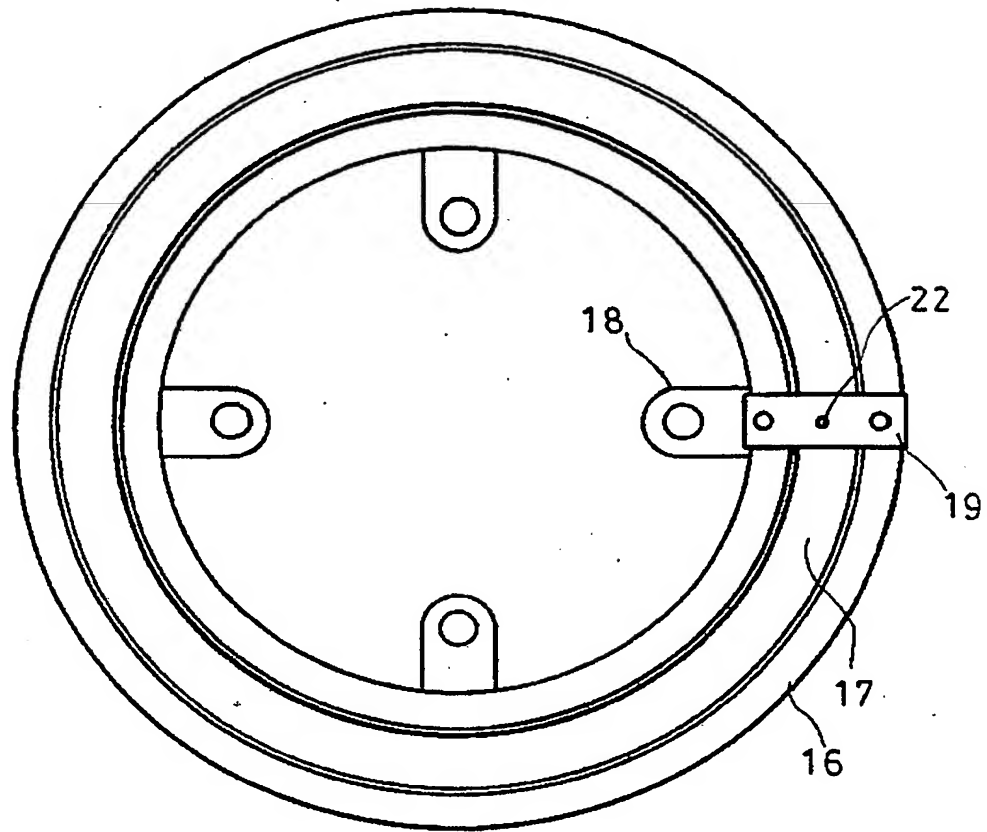


FIG. 4

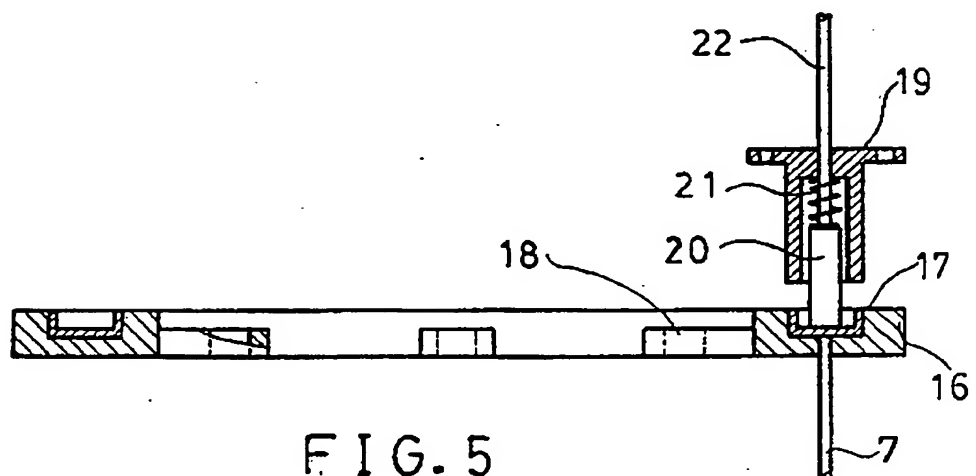


FIG. 5

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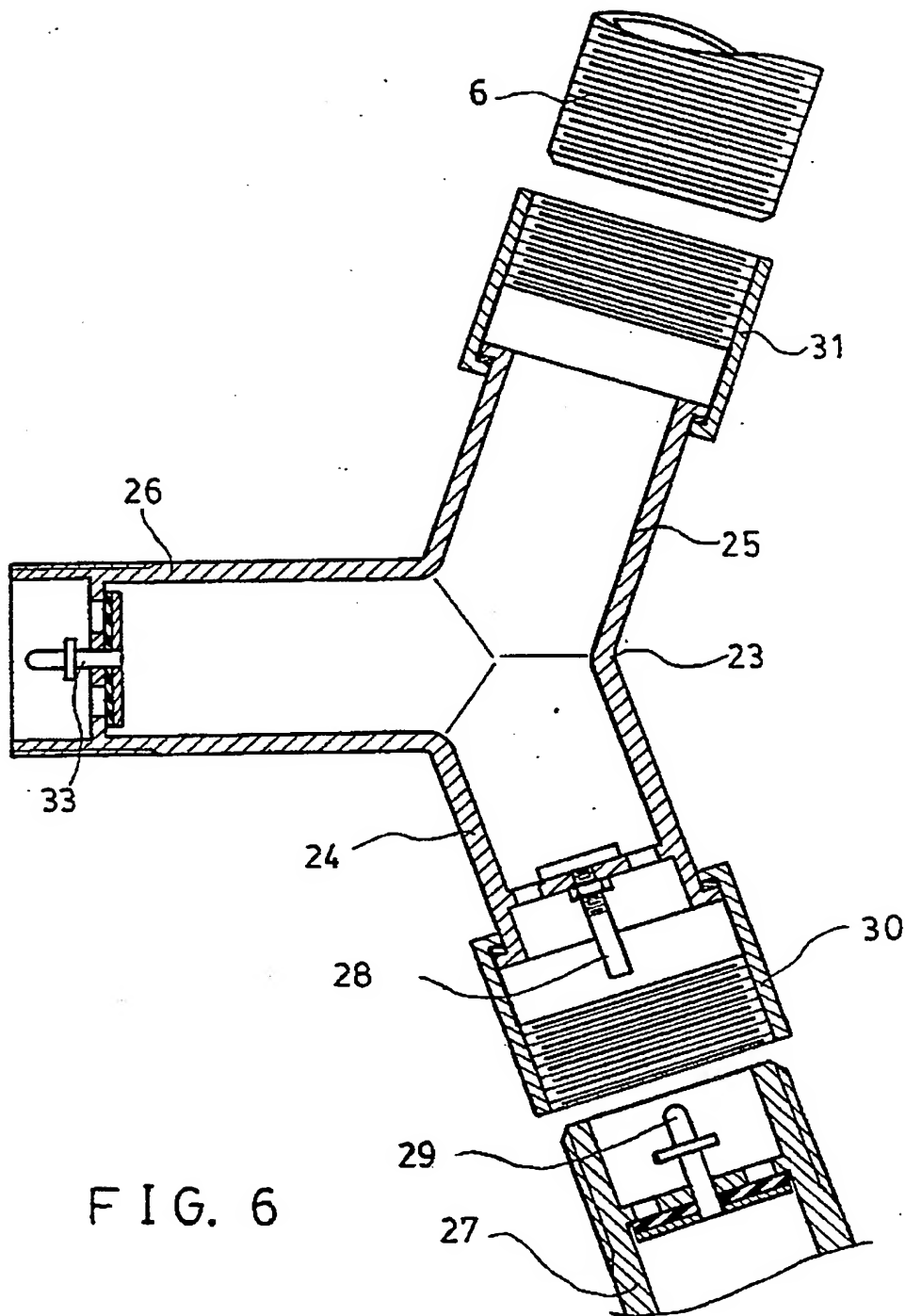


FIG. 6

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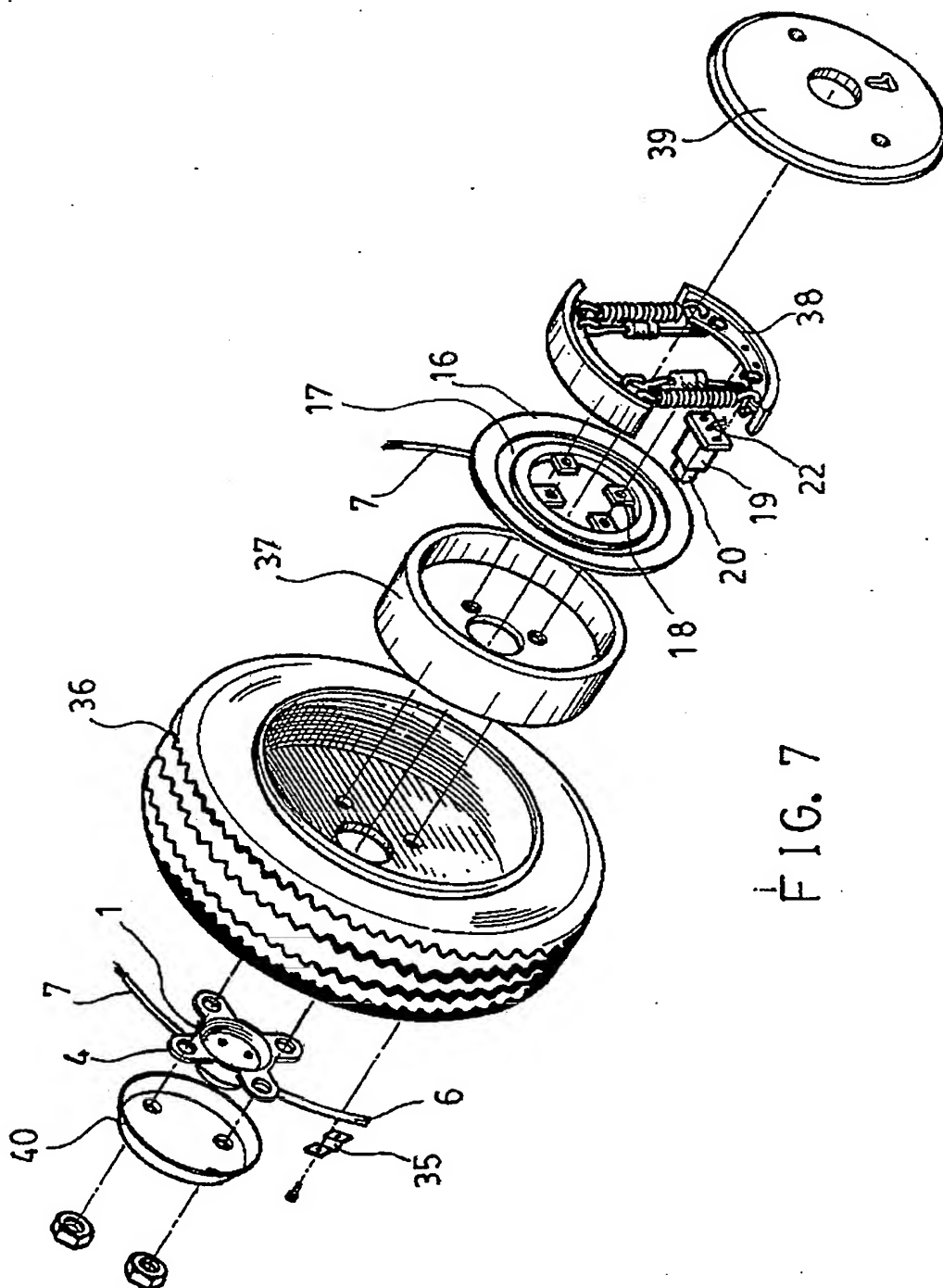


FIG. 7

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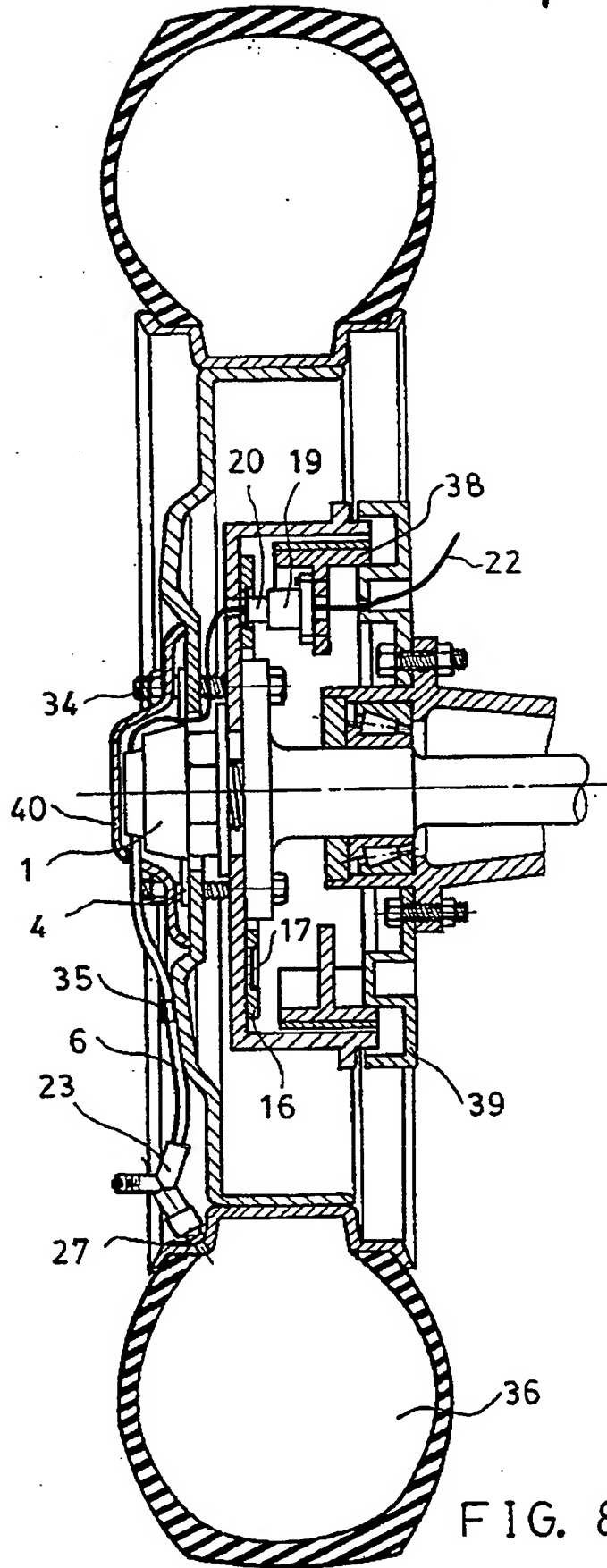


FIG. 8

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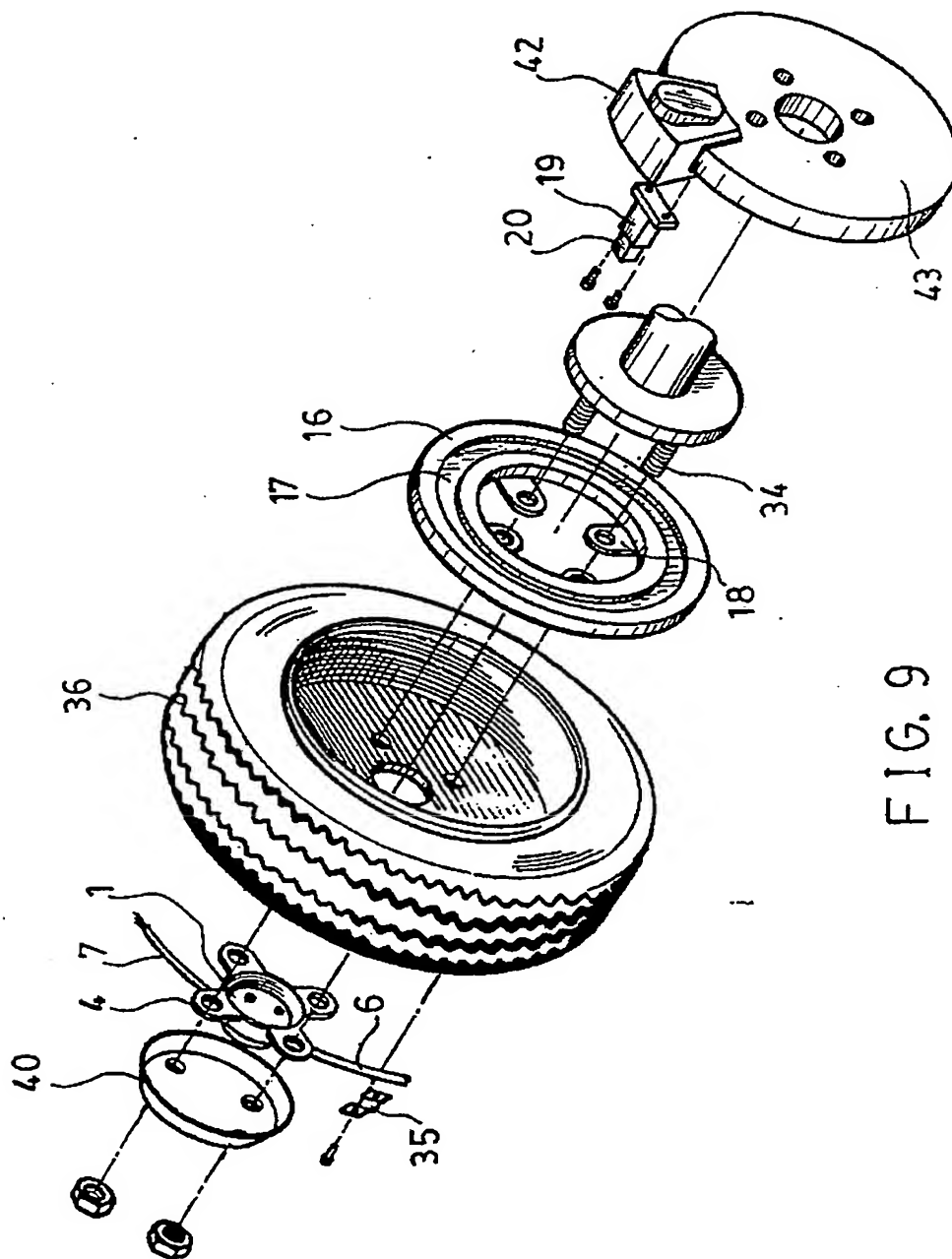


FIG. 9

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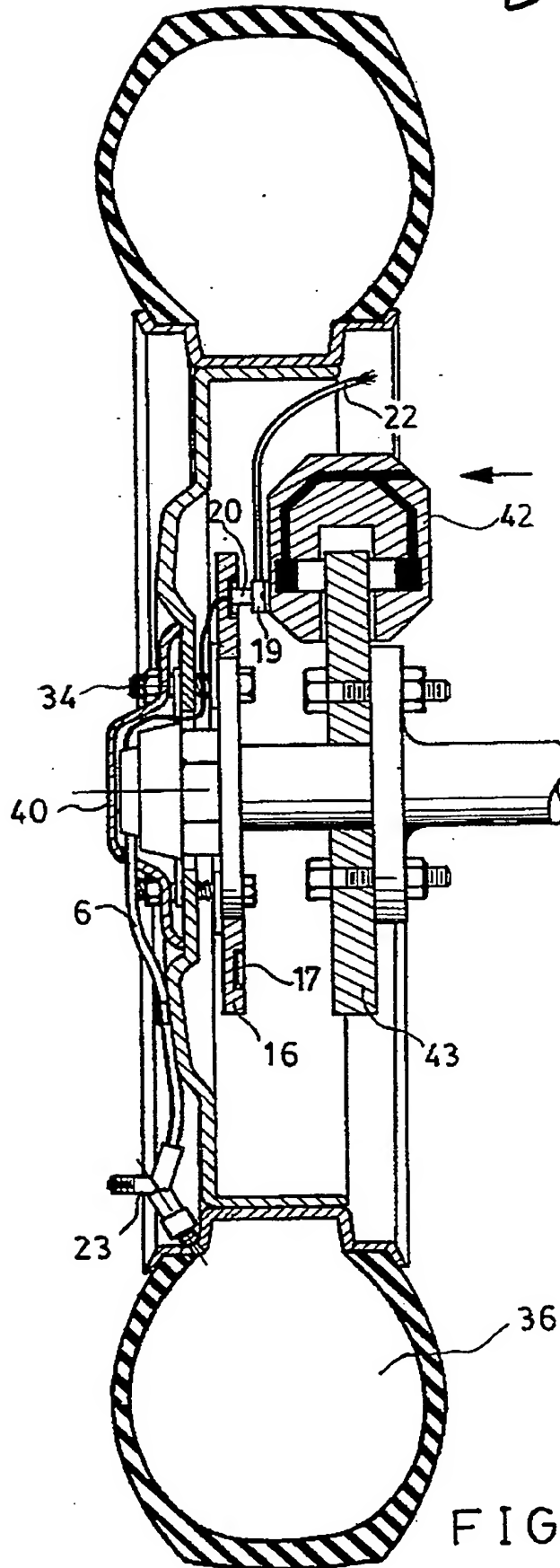


FIG. 10

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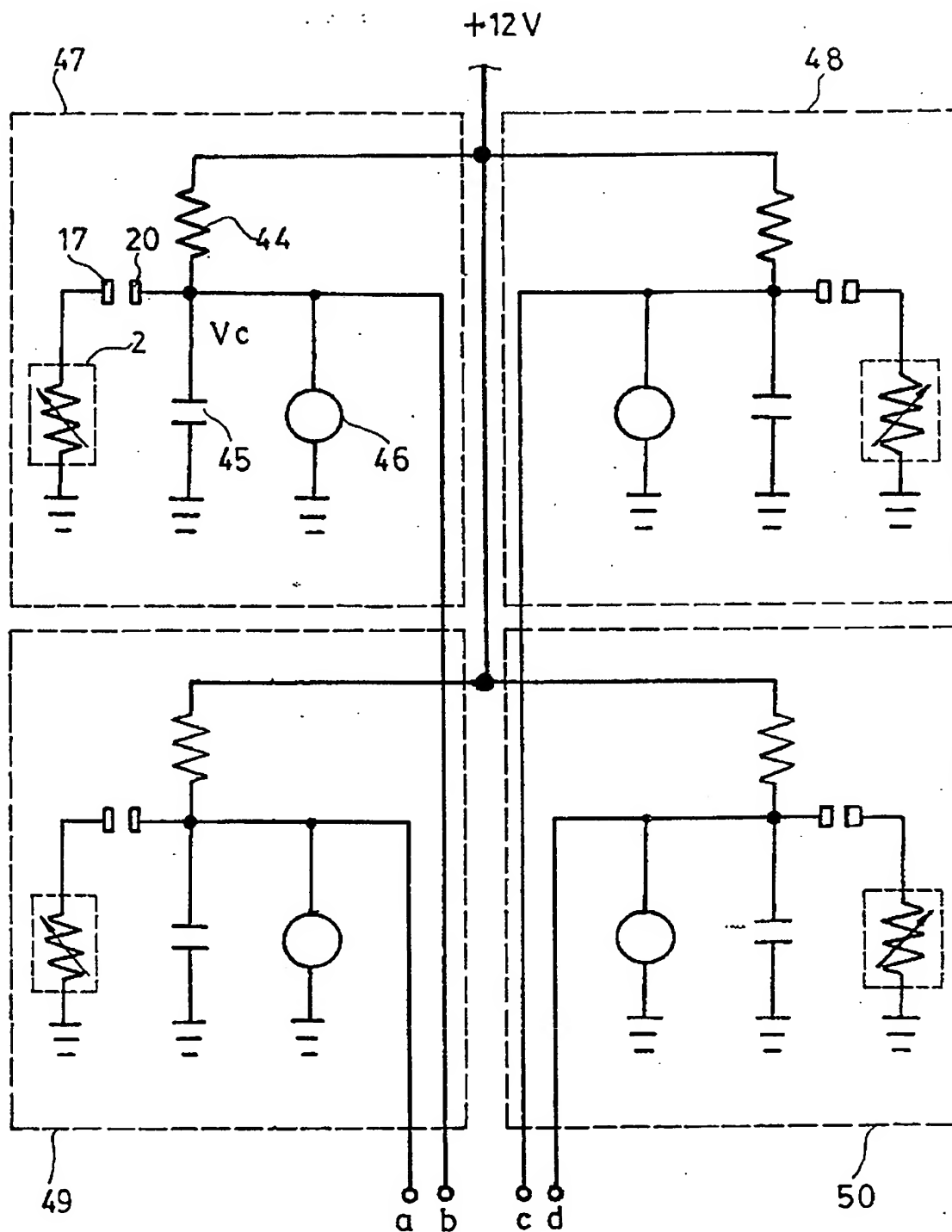


FIG. 11

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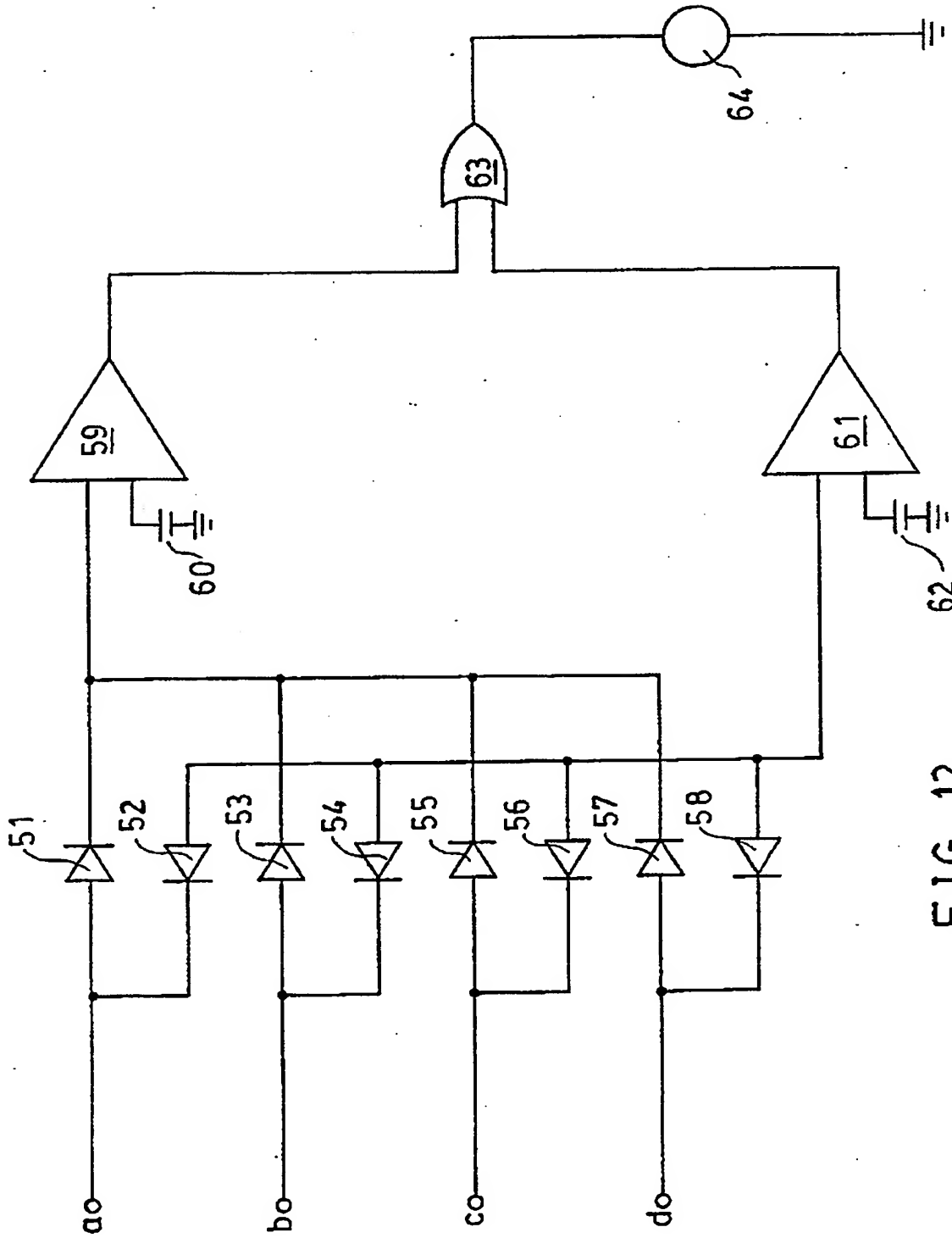


FIG. 12

TYRE PRESSURE DETECTOR AND DISPLAY DEVICE

This invention relates to a tyre pressure detector and display device, particularly the installation of a display device on instrument panel to display tyre pressure and its variation of each tyre. It eliminates the need of measuring tyre pressure after parking. It gives data for driver's reference so that he can be duly aware of tyre pressure and its change during driving. The present invention is applicable to car with either disc type or drum type brake.

Another objective of the present invention is to give an alarm for high and low tyre pressure in audible and visible form to warn the driver in order to prevent from accident. The present invention can display tyre pressure and give instant alarm for abnormal tyre pressure. It eliminates trouble of tyre pressure measuring and prevents from accident due to negligence.

Tyres are essential parts of car. Tyre pressure plays an important in stable driving and safety of both driver and passengers. Low pressure will make manipulation difficult and cause high fuel consumption as well as abnormal tyre wearing. High tyre pressure will cause shock at driving and may cause tyre puncture in high speed or long distance driving. Therefore, detection of tyre pressure during driving is necessary. However, the tyre pressure measuring instrument available at the market now are not a built-in part of car and careless driver may neglect to use it. Then, failure to detect

and be aware of abnormal tyre pressure may result in accident.

In view of the above defects, the inventor created a tyre pressure detector and display device to be a built-in part of car to eliminate the above defects, to assure safe driving and to protect driver and passengers.

The present invention provides a tyre pressure detector and display device which can convert tyre pressure to electric signal and display tyre pressure at a display device mounted on instrument panel. It applies a sensor at each tyre to detect tyre pressure via a T connector and a transmitter, converts the tyre pressure to electric signal, and send the signal to a control circuit. Then, according to the signal, the display device displays the tyre pressure, and gives audible and visible alarm signal whenever abnormal tyre pressure is detected so that driver can be fully aware of tyre pressure condition at any moment during driving.;

An embodiment of this invention is described by way of example with reference to the drawings in which:

FIG.1 illustrates structure of a tyre pressure detector and display device according to the present invention.

FIG.2 is a side view of that in FIG.1.

FIG.3 illustrates an embodiment of sensor according to the present invention.

FIG.4 illustrates a brush and an insulating block according to the present invention.

FIG.5 is a side view of that in FIG.4.

FIG.6 is sectional view of an embodiment of T connector according to the present invention.

FIG.7 is a fragmental view illustrating an application of the present invention on drum type brake.

FIG.8 is a sectional view of that in FIG.7.

FIG.9 is a fragmental view illustration an application of the present invention on disc type brake.

FIG.10 is a sectional view of that in FIG.9.

FIG.11 is circuit diagram for an embodiment of the display device according to the present invention.

FIG.12 is a circuit diagram for an embodiment of the display device according to the present invention.

Please refer to FIG.1 which illustrates structure of the present invention, and FIG.2, a side view of that in FIG.1. It is mainly composed of a pressure detector (1), a sensor (2), a sensor holder (3), a pressure detector holder (4) and a protection cover (5). The sensor (2) is placed at the center of the pressure detector (1). And end of the sensor (2) is connecting to a transmitter (6) to detect variation of tyre pressure, and another end to a conductive wire (7) to transmit electric signal from the sensor (2) via a terminal (41). The sensor (2) has its resisistance changed according to change of tyre pressure.

FIG.3 shows an embodiment of a sensor according

to the present invention. Tyre pressure embodiment
put port (8) causes a corresponding displacement by
means of a bourdon pipe (9), which, via a mechanical
link (10) and a sector gear (11), rotates a gear (13)
on a rheostat (12) in order to change resistance of
the rheostat (12). There is a terminal (14) for earthing.
The terminal (41) is connecting to a terminal (15).

Please refer to FIG.4 which illustrates a
brush and an insulating block, and FIG.5, a side view
of that in FIG.4. The insulating block (16) is a disc
on which a pole (17) is installed. Electric signals
from the sensor (2) is transmitted to the pole (17)
via the conductive wire (7). The insulating block (18)
is to be fixed on a brake drum. There is a brush seat
(19) on which the brush (20) is located to keep contact
with the pole by elasticity of a spring (21) and to
pick up electric signal from the pole (17) via output
from the conductive wire (22).

Please refer to FIG.6 for an embodiment of
T connector according to the present invention. The
T connector (23) has three connectors (24), (25) and
(26) in three different directions. The connector (24)
is of threaded to connect with tyre air valve (27).
It has a projection (28) to open check valve (29) in
air valve (27) for outward flowing of compressed air
from the tyre via the connector (25), transmitter (6)
to the pressure detector (1). As soon as the connector
(24) is disengaged from the air valve (27), the check

valve (29) function to prevent from air leakage from the tyre. The connector (24) is incorporated with an union (30) to lock the air valve (27). The connector (25) is of hollow and is connecting to the transmitter (6) by means of an union (31) so that aftering connecting the connector (24) to the air valve (27), the outflowing compressed air can be led to the sensor (2) in the pressure detector (1) via the transmitter (6). The connector (26) is incorporated with a check valve to substitute the air valve (27) for inflation purpose.

Please refer to FIG.7, a fragmental view illustrating an embodiment of the present invention applied on drum type brake, and FIG.8, a sectional view of that shown in FIG.7. Thre pressure detector (1) is fixed by means of screws (34) to the pressure detector holder (4), the tyre (36) and the insulating block (18) just at the center of wheel shaft for the tyre (36).

An end of the pressure detector (1) is connecting to the air valve (27) via the T connector (23) in order to pick up tyre pressure. The transmitter (6) is fixed by a pressing plate (35). Another end of the pressure detector (1) is connecting to the conductive wire (7) for transmission of electric signal to the pole (17). The insulating block (16) is fixed to the insulating block holder (18) by means of screws. The disc (43) is controlled by the brake (42).

Please refer to FIG.11, a circuit diagram of an embodiment of a display according to the present

invention. The sensor (2) is connecting to V_c of the display via the pole (17) and the brush (20). The resistor (44) provides shunt resistance to the sensor (2). The capacitor (45) is to eliminate noise. The sensor (2) changes its resistance according to variation of tyre pressure, i.e., causes change of potential at V_c . Therefore, the meter (46) displays tyre pressure according to the potential at V_c . The circuit diagram shows a circuit for normal automobile with four wheels in order to detect tyre pressure from four respective tyres, and display them with four independent display (47), (48), (49), and (50). V_c is marked as a, b, c and d respectively for independent display of tyre pressure.

Please refer to FIG.12 for a circuit diagram of an embodiment of an alarm according to the present invention, in which signal input is from a, b, c and d respectively. High tyre pressure is detected by four respective diodes (51), (53), (55), and (57), and compared with a reference voltage (60) by an operational amplifier (59). Low tyre pressure is detected by four respective diodes (52), (54), (56) and (58), and compared with a reference pressure (62) by an operational amplifier (61). The diodes are located to separate the four independent displays. The OR Gate (63) is for OR Gate logic operation of output signal from the operational amplifiers (59) and (61) so that the operational amplifier (59) or (61) can detect extra high tyre pressure or low tyre pressure, the OR Gate (63) can cause the alarm (64)

to give a audible and visible alarm to warn driver.

Application of the present invention may cause tyres unbalanced. Addition of lead to unbalanced position on wheel rims can set off the unbalance occurred at high speed driving.

The above description referred to a preferred embodiment of the present invention which in no way may limit scope of embodiment according to the present invention. That is, any alternation or modification of which in any shape or sturcture within the characteristics and spirit described herein shall include in the scope of patents claimed here. Any skilled person in this art is capable to alter and modify the preferred embodiment to meet various requirements within the essence stated here.

In conclusion, the present invention provides a tyre pressure detector with display installed in cab or instrument panel in front of driver's seat to indicate respective tyre pressure and its change. It can give alarm as soon as pressure of any tyre is found abnormal and the alarm can be given in audible and visible forms to warn the driver for prevention of accident. It is a safety device for driving. It is a safe guard for driver and passengers. It eliminates the need for preparing extra tools for tyre pressre measuring and the incovenience from measuring tyre pressure only after parking. It further eliminates accident due to negligence in checking tyre pressur. The present invention has been never

seen in any publication, and therefore, it is a novel,
advance and patentable invention.

CLAIMS

1. A tyre pressure detector and display device comprising;

- a round pressure detector, to be installed at the center of wheel shaft for its corresponding tyre, composed of a sensor fixed to it which screws, a transmitter connected to an end of the sensor, a conductive wire connected to another end of the sensor, a protection cover covering and fixed on it with screws, and a pressure detector holder to be fixed to wheel rim with screws;

- a round insulating block with a recession to hold a pole, beneath which a conductive wire is connected, a insulative brush seat incorporated with a compression spring and a brush connecting to a conducting wire, installed in a manner that the pole seat is fixed inner side of brake drum with rim bolts, and the brush seat is fixed on with rim bolts so that the pole and the brush are perpendicular to each other for frictional contact while it is applied to car with disc type brake, or the pole seat is fixed to wheel rim with rim bolts and the brush seat is fixed to a brake with screws so that the pole and the brush are perpendicular to each other for frictional contact while it is applied to car with drum type brake;

- a T connector incorporating a hollow connector connecting to the transmitter, a connector with built-in check valve, and a connector with thread

at one end and union around it to connect to air valve on a tyre;

- a plurality of indepent display device which display according to electric signal output from each
5 respective sensor; and

- an alarm to detect high or low tyre pressure;

and characterized by the pressure detector which detects tyre pressure from the T connector, converts the tyre pressure to electric signal, transmits
10 the signal to the pole located on the insulating block at the brake drum via the conductive wire, displays the tyre pressure on a display device through a detection and display circuit, and, gives instant alarm in case of high or low tyre pressure as a
15 warning signal to driver.

2. A tyre pressure detector and display device as claimed in Claim 1 wherein the pressure detector is corporated with a pressure detector block fixed at the center
20 of wheel shaft by means of rim bolts.

3. A tyre pressure detector and display device as claimed in Claim 1 wherein the insulating block has an insulating block holder at one side fixed with rim bolts.

25 4. A tyre pressure detector and display device as claimed in Claim 1 wherein the T connector has a projection at the center to open check valv. within air valve

after connecting the connector to the air valve to allow outflowing of compressed air from the tyre via the transmitter to the sensor and has a check valve to substitute the air valve for inflation purpose.

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5. A tyre pressure detector and display device as claimed in Claim wherein the sensor is in the form of a rheostat providing output to the pole with a terminal and the conductive wire so that the brush can pick up signal for the display device.

6. A tyre pressure detector and display device as claimed in Claim 1 wherein the display device is shunted by a resistor and the sensor so that potential at Vc varies according to resistance of the sensor, and has a capacitor to filter noise before display at the display device.

7. A tyre pressure detector and display device as claim in Claim 1 wherein the alarm has a plurality of diode to detect high tyre pressure, an operational amplifier for comparing it with a reference potential before giving an input to an OR Gate, a plurality of diode to detect low tyre pressure, an operational amplifier for comparing it with a reference potential before giving input to an OR Gate, and can give a warning signal in case of high or low pressure.

8. A sensor as claimed in Claim 5 wherein the sensor is incorporated with a boudon pipe to generate corresponding displacement to vary resistance of a rheostat by means of a mechanical link and a sector gear which can rotate a gear on the rheostat.
- 5 9. A laterally swinging hinge device and arranged substantially as herein described with reference to any of the figures of the drawings.

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